FIG.1

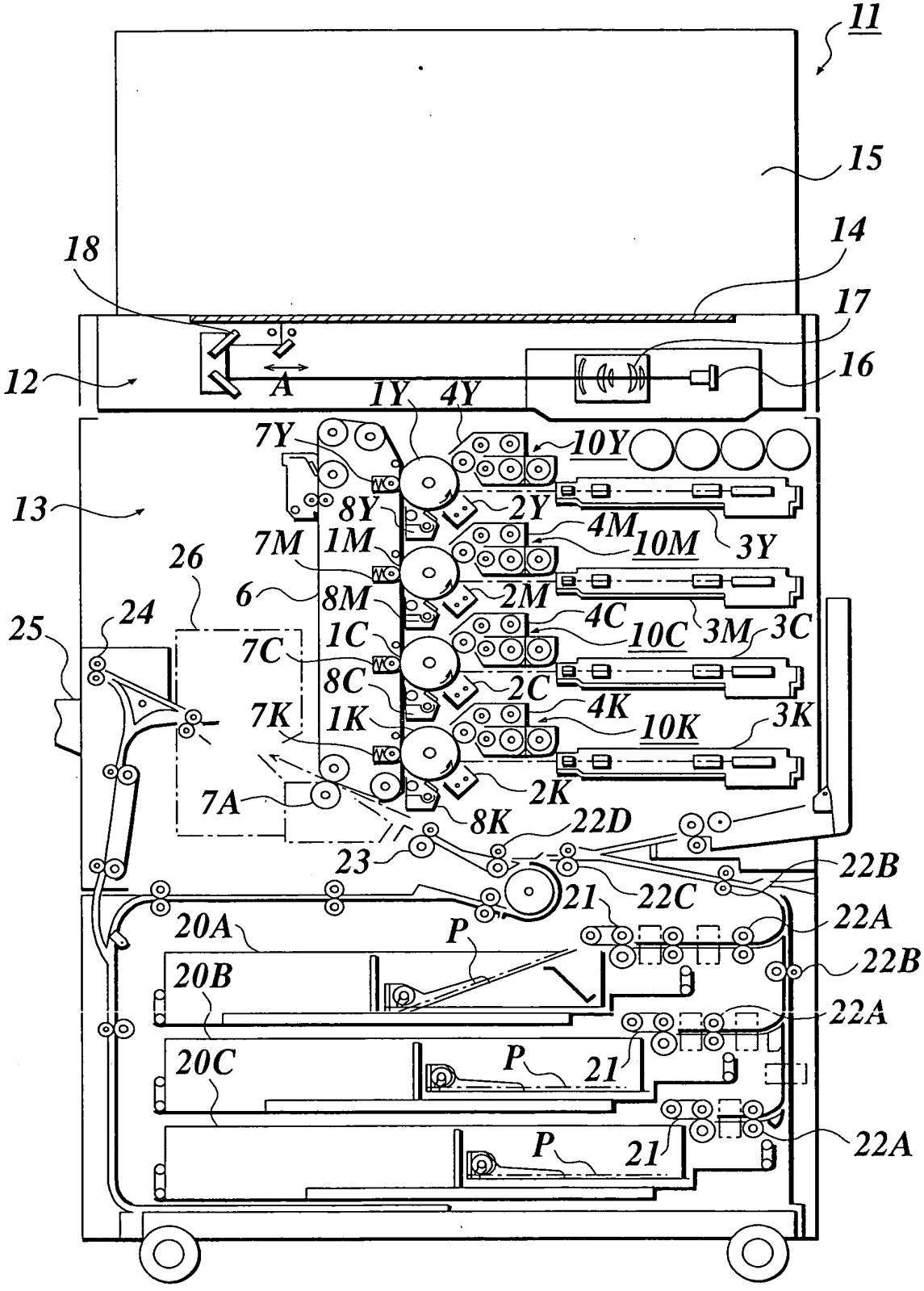
11
15
14
18
17
16
12
A
1Y
4Y
7Y
10Y
13
8Y
2Y
4M
10M
3Y
7M
1M
26
6
8M
2M
4C
10C
3M
3C
24
25
7C
1C
8C
2C
7K
1K
4K
10K
3K
7A
2K
8K
22D
23
22B
21
22C
22A
20A
P
20B
22B
22A
20C
P
21
P
21
22A

FIG.2

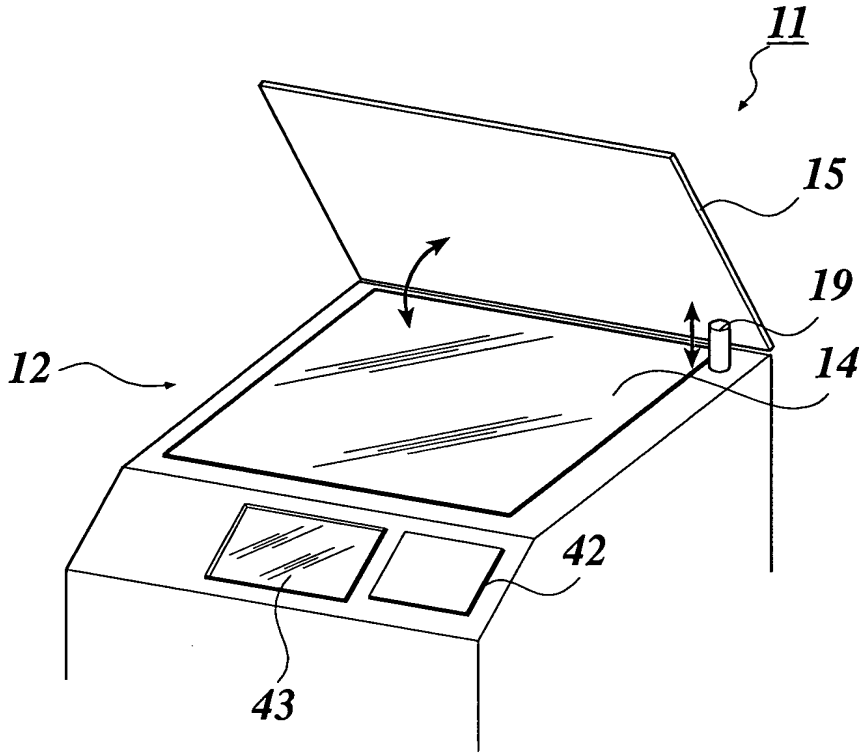

FIG.3A

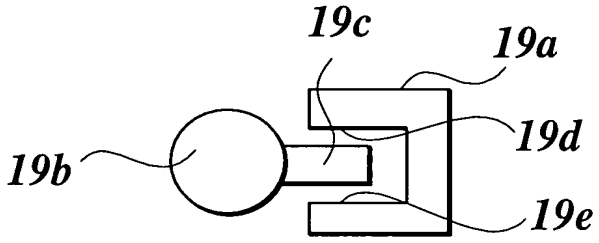

FIG.3B

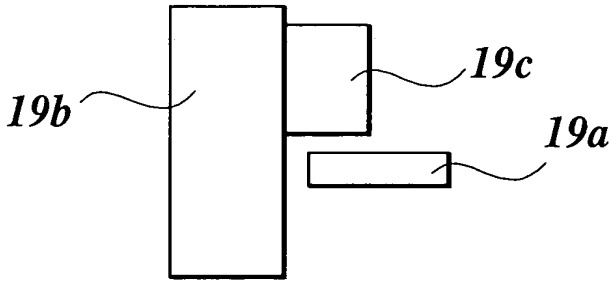

FIG.4

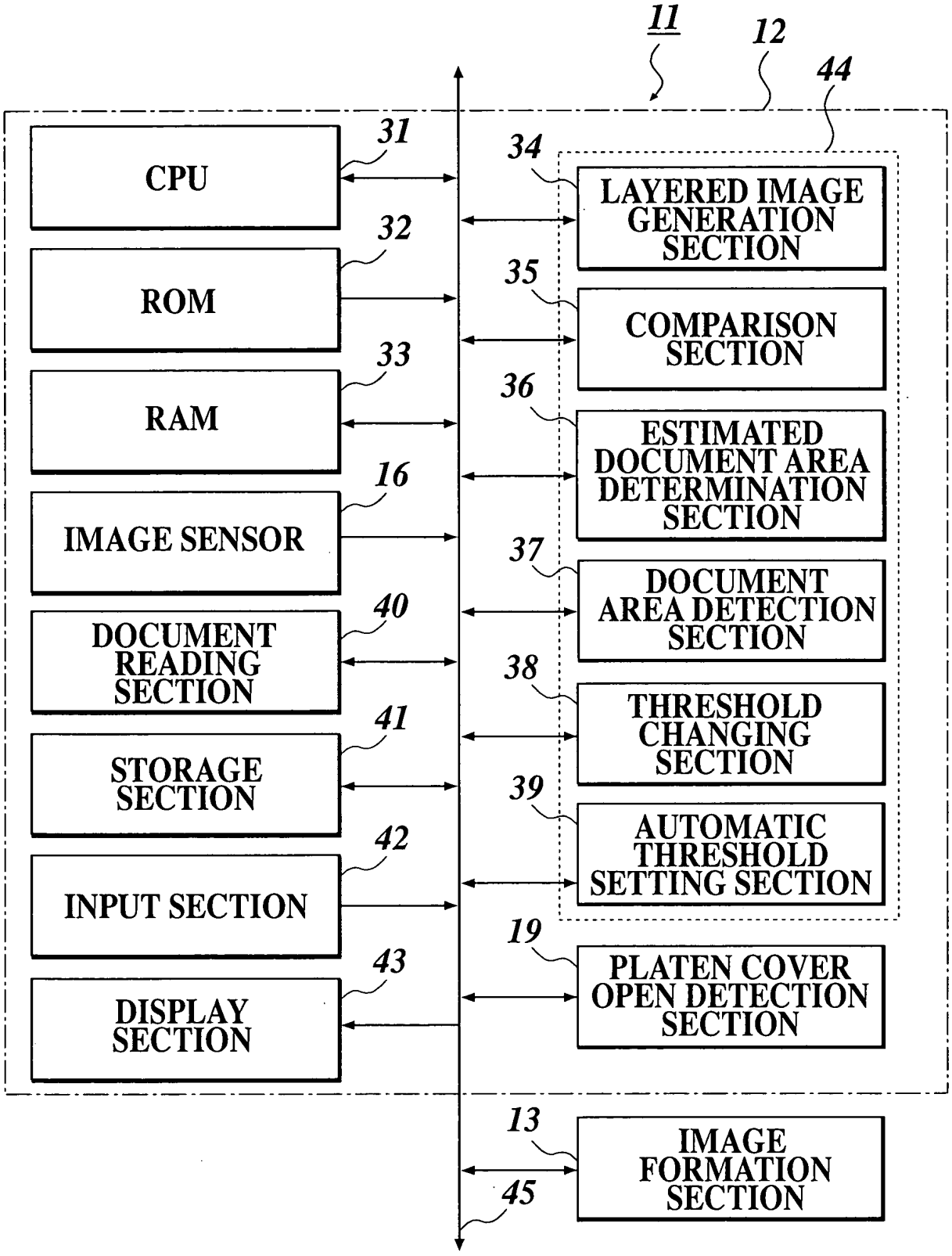
11
12
44
CPU
31
ROM
32
RAM
33
IMAGE SENSOR
16
DOCUMENT READING SECTION
40
STORAGE SECTION
41
INPUT SECTION
42
DISPLAY SECTION
43
34
LAYERED IMAGE GENERATION SECTION
35
COMPARISON SECTION
36
ESTIMATED DOCUMENT AREA DETERMINATION SECTION
37
DOCUMENT AREA DETECTION SECTION
38
THRESHOLD CHANGING SECTION
39
AUTOMATIC THRESHOLD SETTING SECTION
19
PLATEN COVER OPEN DETECTION SECTION
13
IMAGE FORMATION SECTION
45

FIG.5

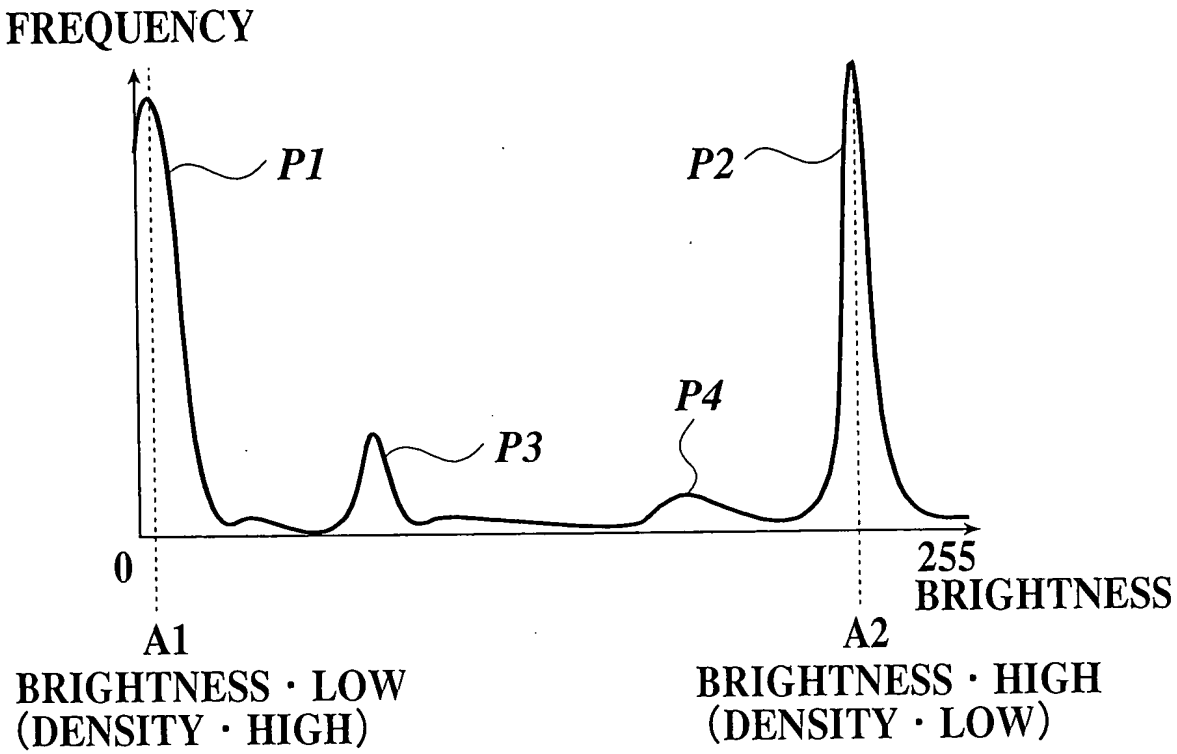
FREQUENCY
P1
P2
P3
P4
0
255
BRIGHTNESS
A1
A2
BRIGHTNESS · LOW
(DENSITY · HIGH)
BRIGHTNESS · HIGH
(DENSITY · LOW)

FIG.6

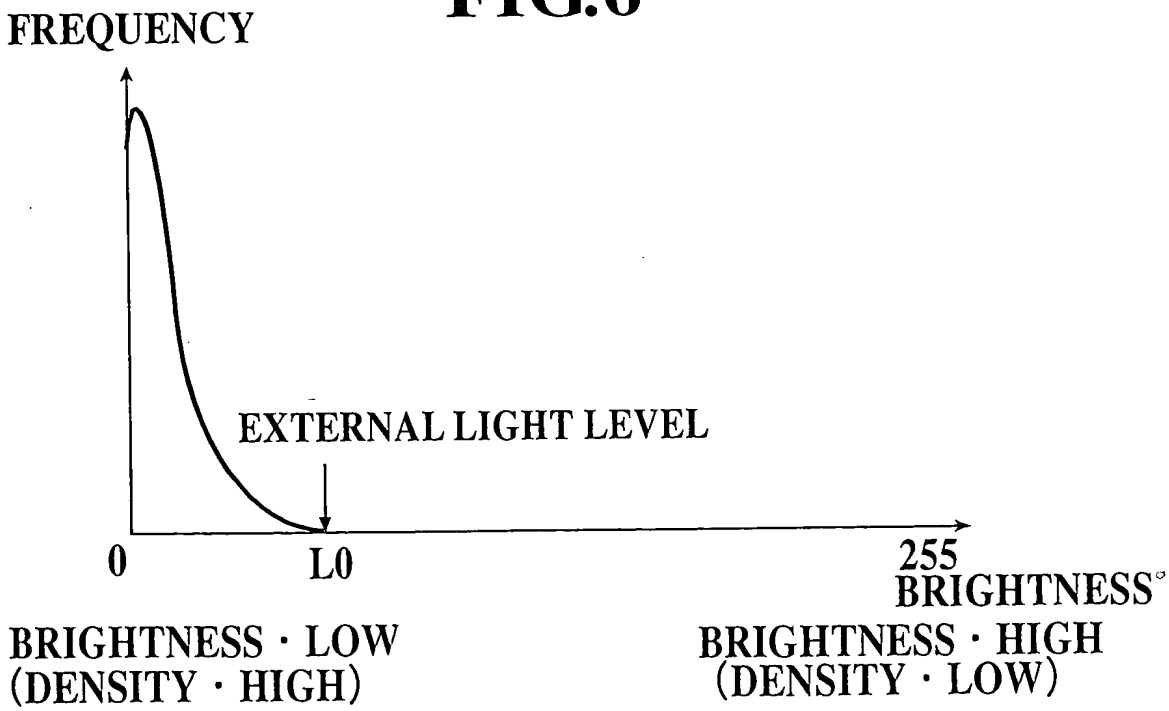
FREQUENCY
EXTERNAL LIGHT LEVEL
0
L0
255
BRIGHTNESS
BRIGHTNESS · LOW
(DENSITY · HIGH)
BRIGHTNESS · HIGH
(DENSITY · LOW)

FIG.7

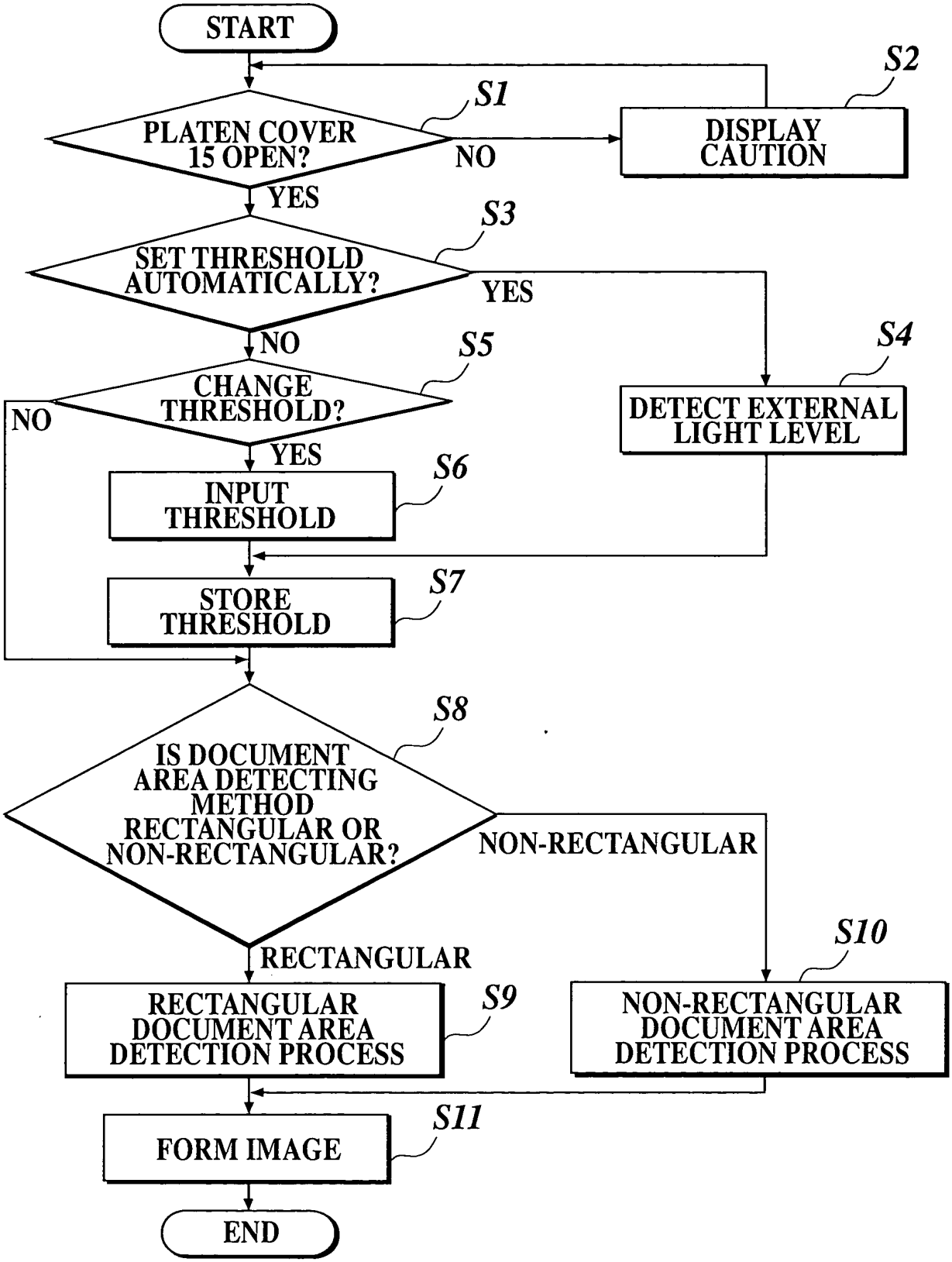
START
S1
PLATEN COVER 15 OPEN?
NO
S2
DISPLAY CAUTION
YES
S3
SET THRESHOLD AUTOMATICALLY?
YES
NO
S5
CHANGE THRESHOLD?
NO
YES
S4
DETECT EXTERNAL LIGHT LEVEL
S6
INPUT THRESHOLD
S7
STORE THRESHOLD
S8
IS DOCUMENT AREA DETECTING METHOD RECTANGULAR OR NON-RECTANGULAR?
NON-RECTANGULAR
RECTANGULAR
S10
NON-RECTANGULAR DOCUMENT AREA DETECTION PROCESS
S9
RECTANGULAR DOCUMENT AREA DETECTION PROCESS
S11
FORM IMAGE
END

FIG.8

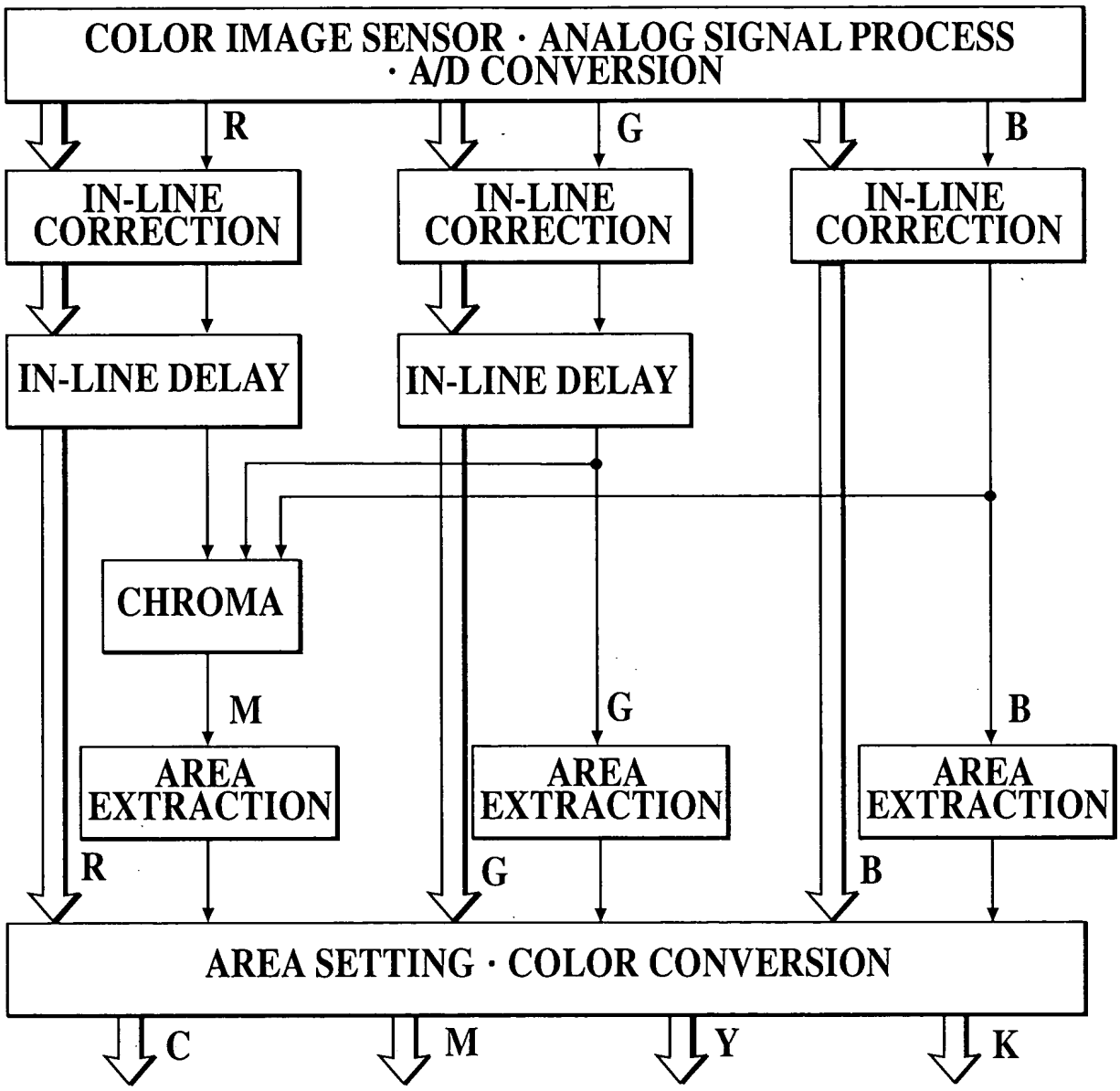
COLOR IMAGE SENSOR · ANALOG SIGNAL PROCESS · A/D CONVERSION
R
G
B
IN-LINE CORRECTION
IN-LINE CORRECTION
IN-LINE CORRECTION
IN-LINE DELAY
IN-LINE DELAY
CHROMA
M
G
B
AREA EXTRACTION
AREA EXTRACTION
AREA EXTRACTION
R
G
B
AREA SETTING · COLOR CONVERSION
C
M
Y
K

FIG.9A

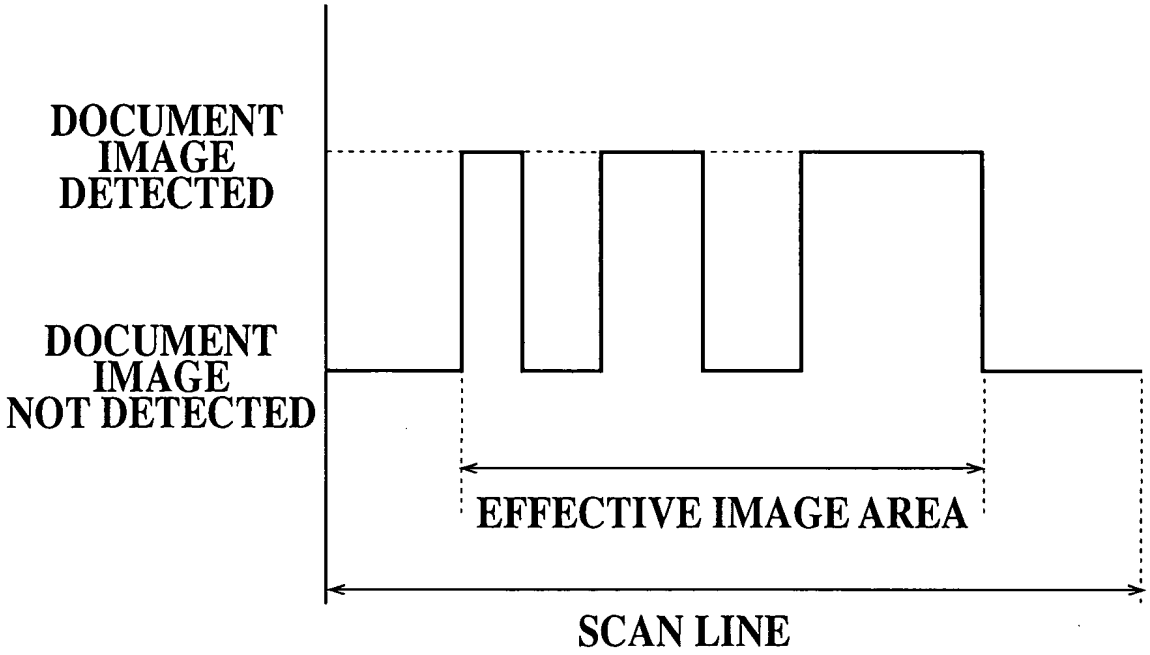
DOCUMENT IMAGE DETECTED
DOCUMENT IMAGE NOT DETECTED
EFFECTIVE IMAGE AREA
SCAN LINE

FIG.9B

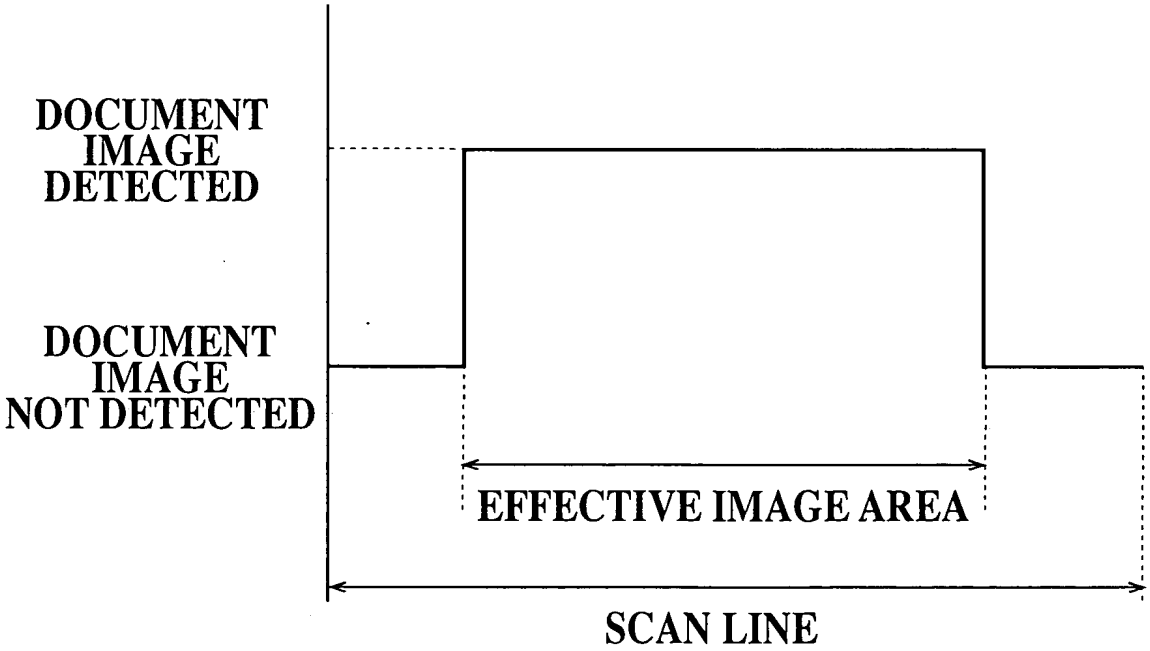
DOCUMENT IMAGE DETECTED
DOCUMENT IMAGE NOT DETECTED
EFFECTIVE IMAGE AREA
SCAN LINE

FIG.10

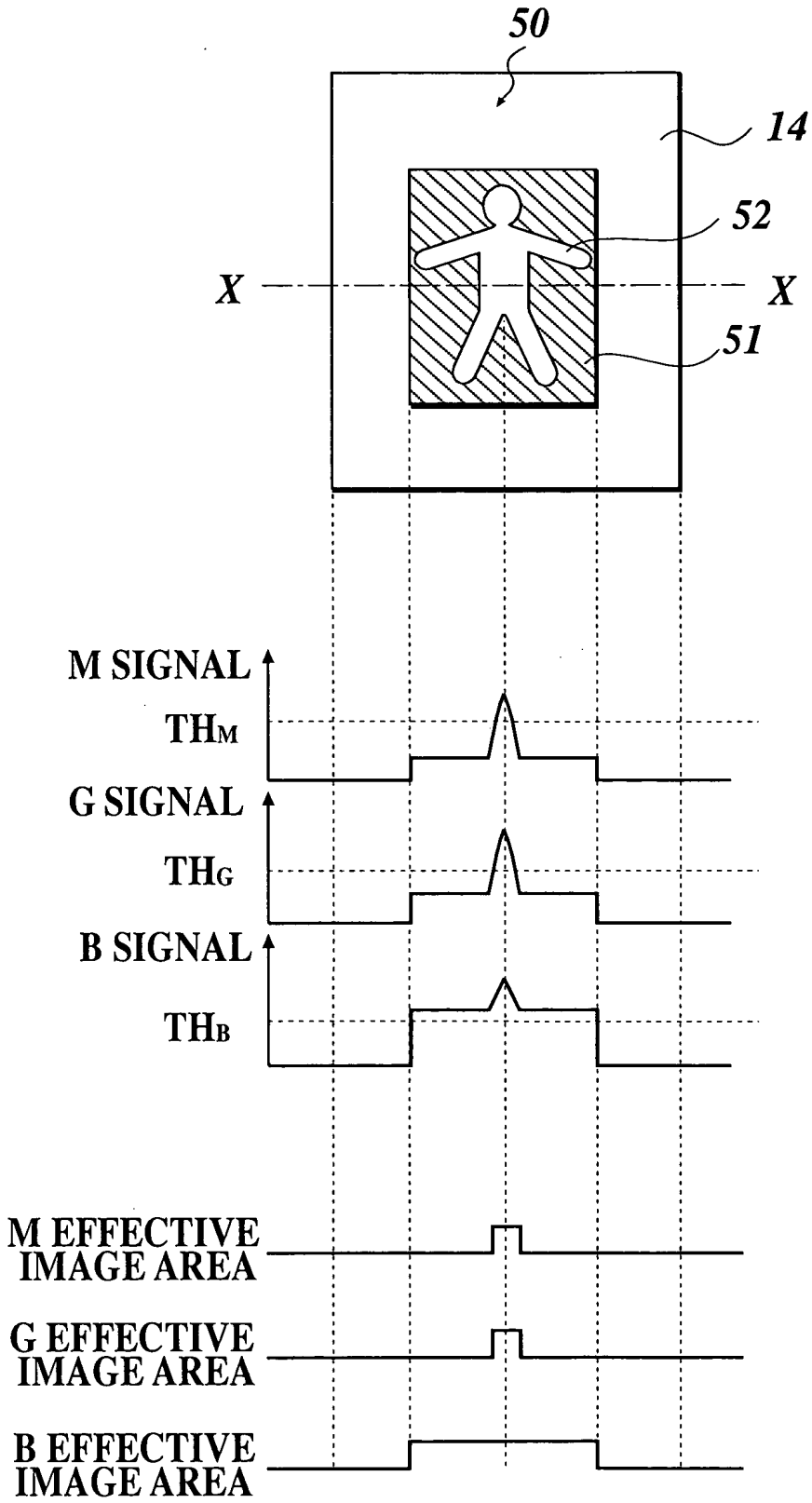
50
14
52
X
X
51
M SIGNAL
THM
G SIGNAL
THG
B SIGNAL
THB
M EFFECTIVE IMAGE AREA
G EFFECTIVE IMAGE AREA
B EFFECTIVE IMAGE AREA

FIG.11

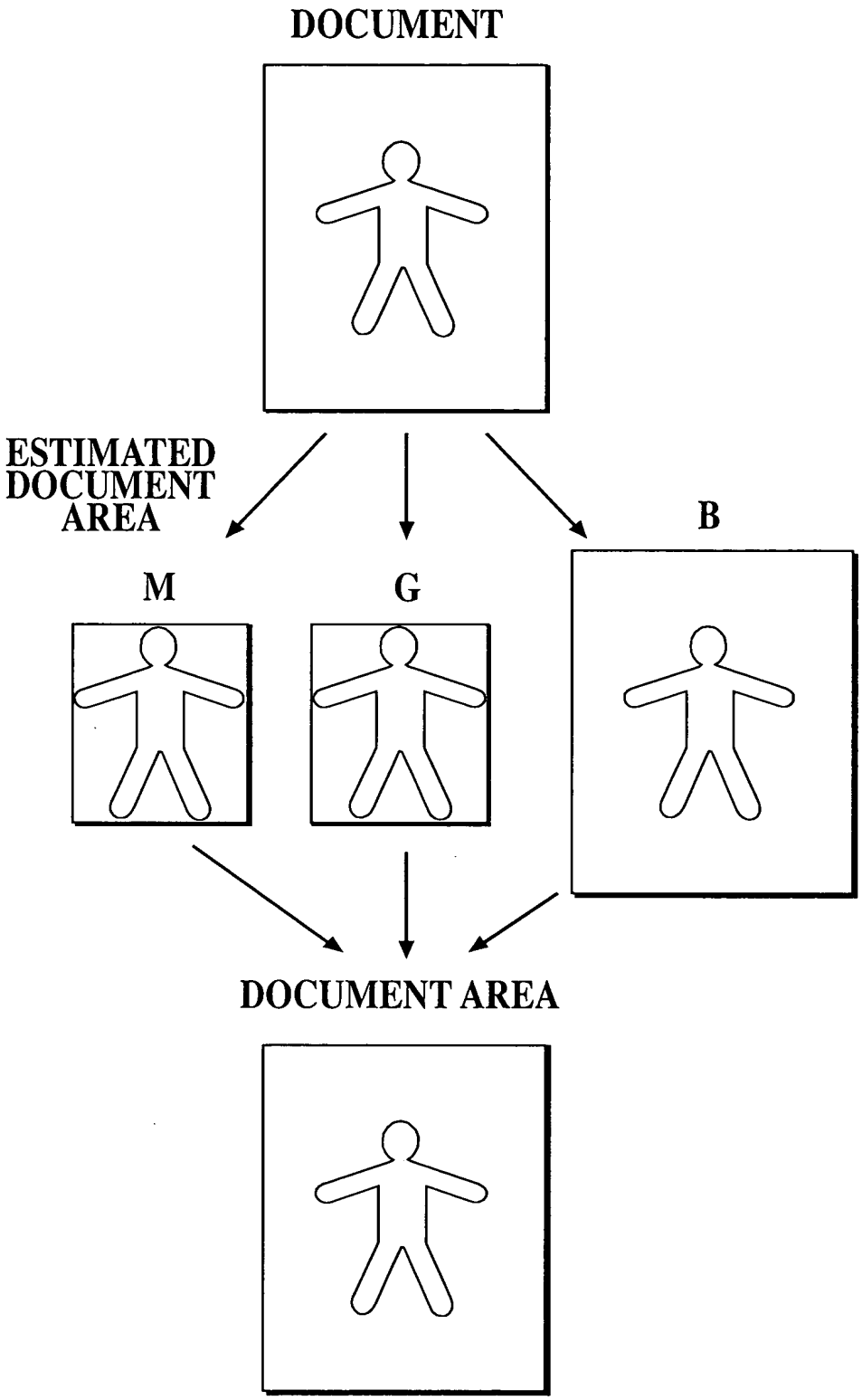

FIG.12

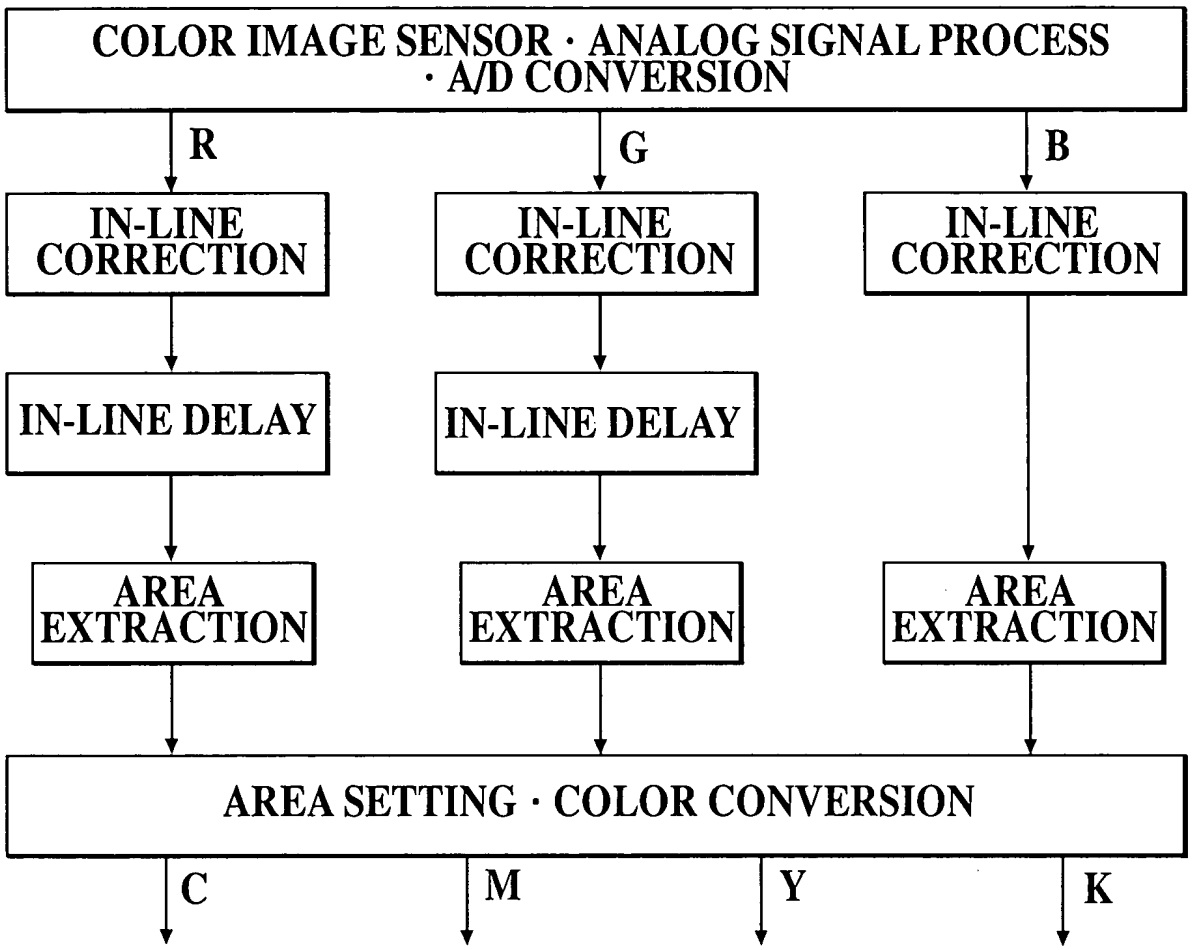
COLOR IMAGE SENSOR · ANALOG SIGNAL PROCESS · A/D CONVERSION
R
G
B
IN-LINE CORRECTION
IN-LINE CORRECTION
IN-LINE CORRECTION
IN-LINE DELAY
IN-LINE DELAY
AREA EXTRACTION
AREA EXTRACTION
AREA EXTRACTION
AREA SETTING · COLOR CONVERSION
C
M
Y
K

FIG.13

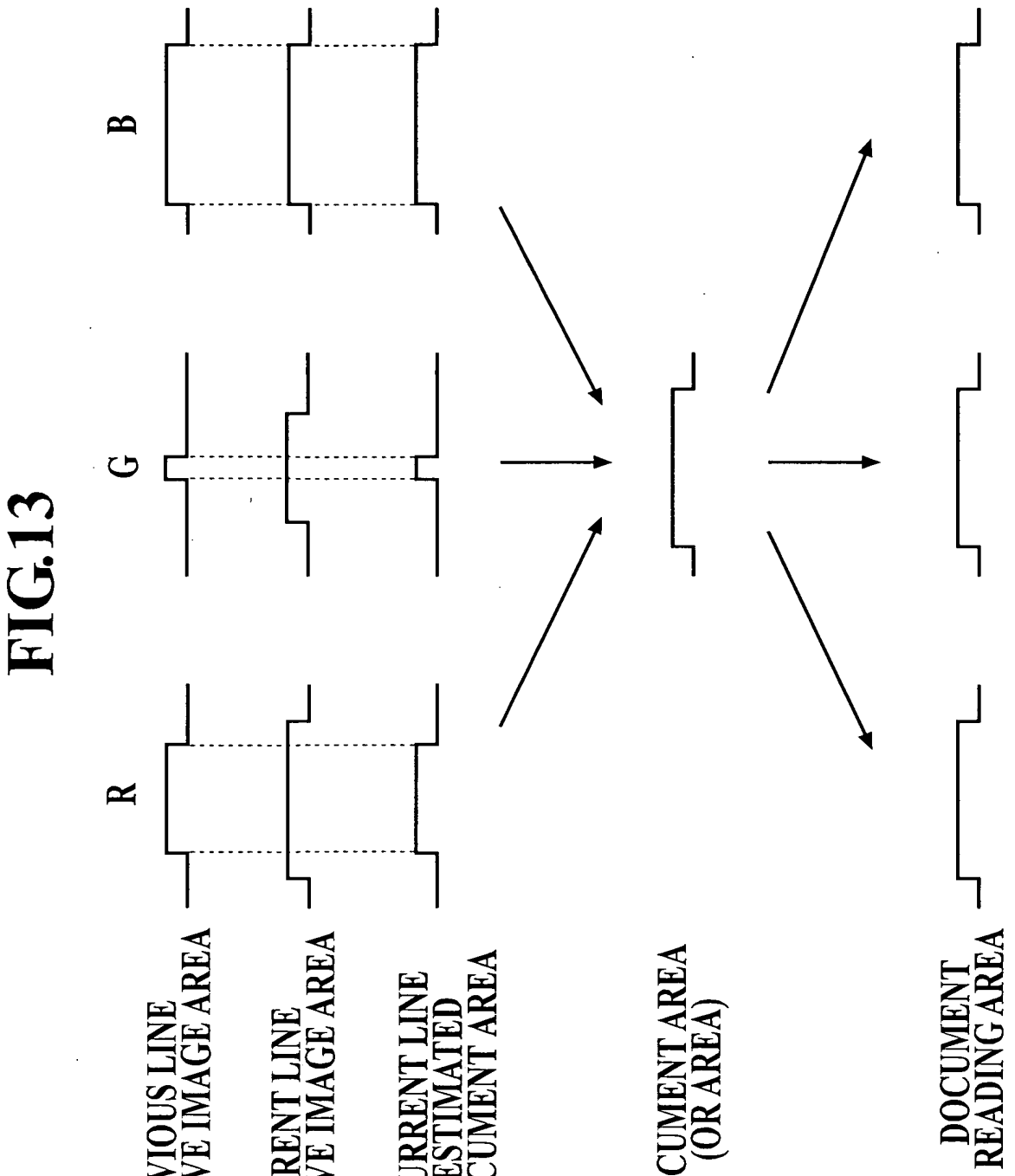
R
G
B
PREVIOUS LINE EFFECTIVE IMAGE AREA
CURRENT LINE EFFECTIVE IMAGE AREA
CURRENT LINE ESTIMATED DOCUMENT AREA
DOCUMENT AREA (OR AREA)
DOCUMENT READING AREA

FIG.14A

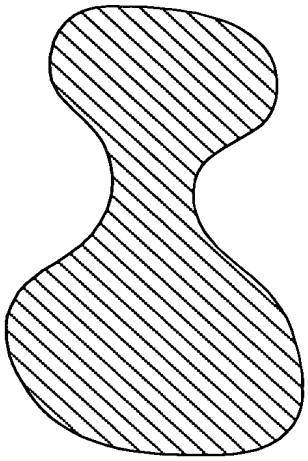

FIG.14B

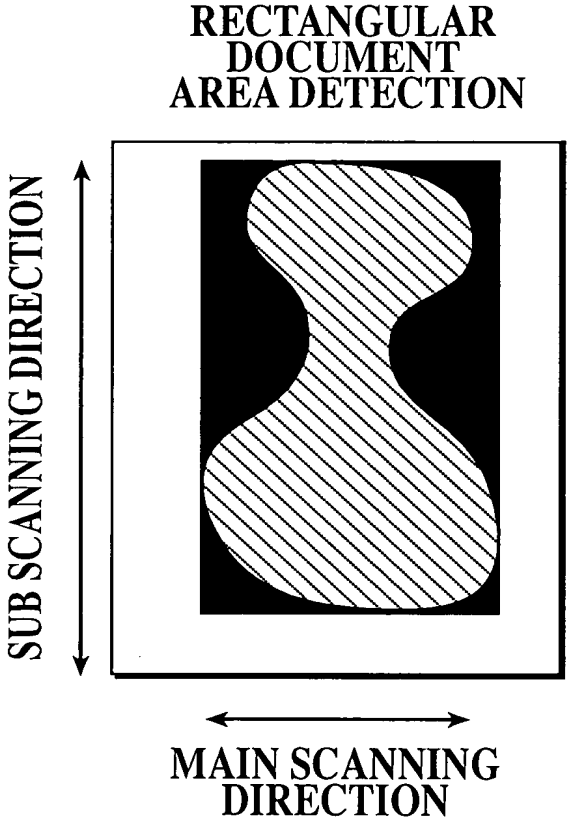

FIG.14C

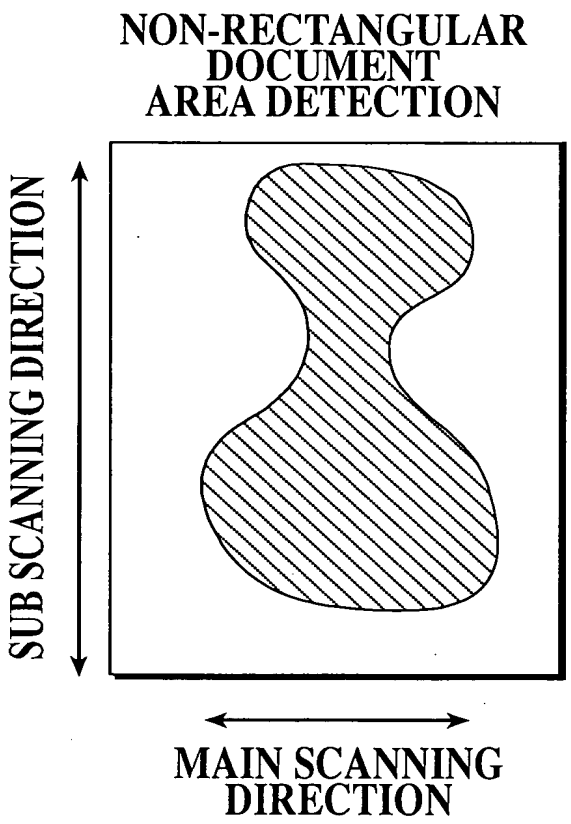

FIG.15

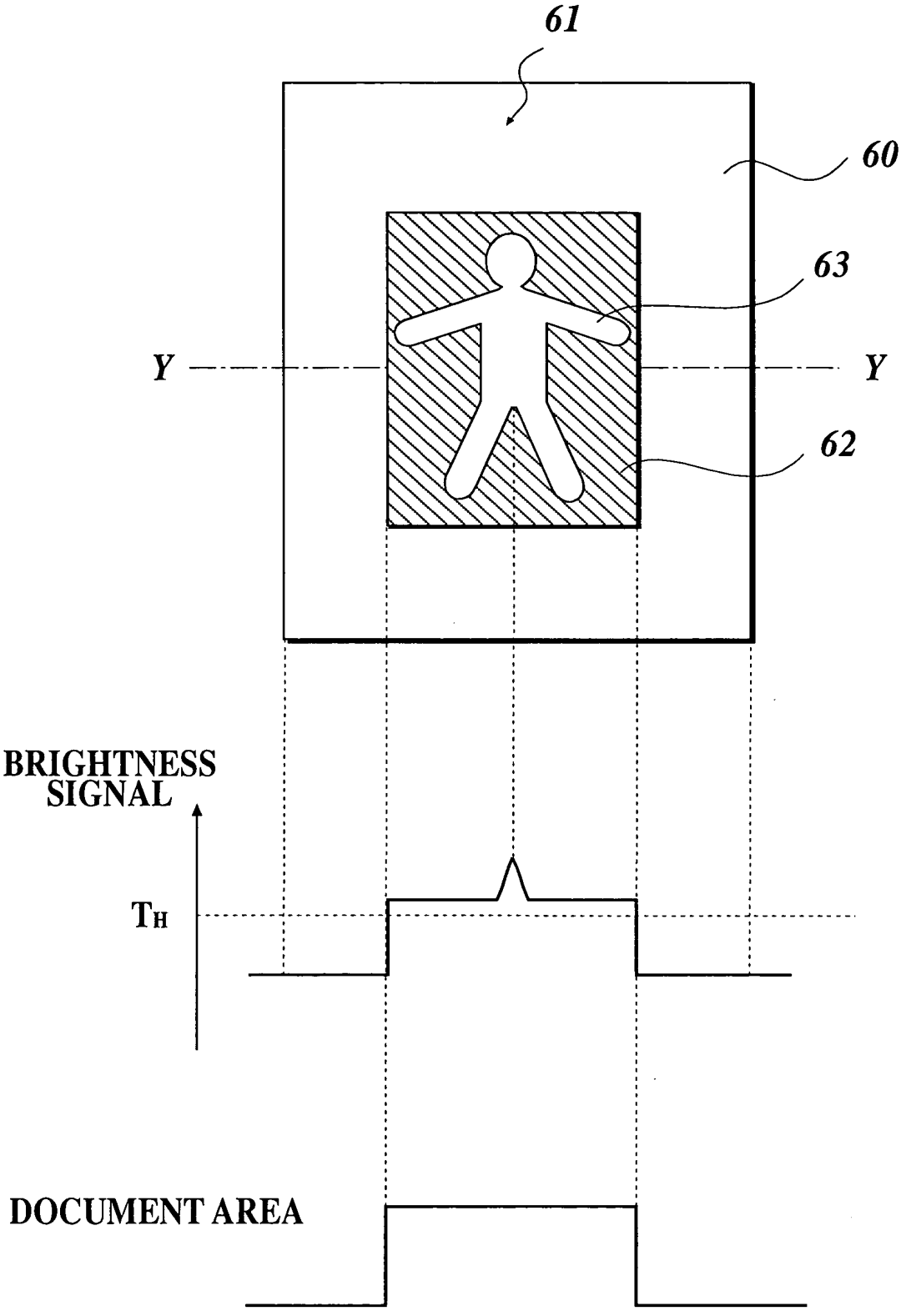
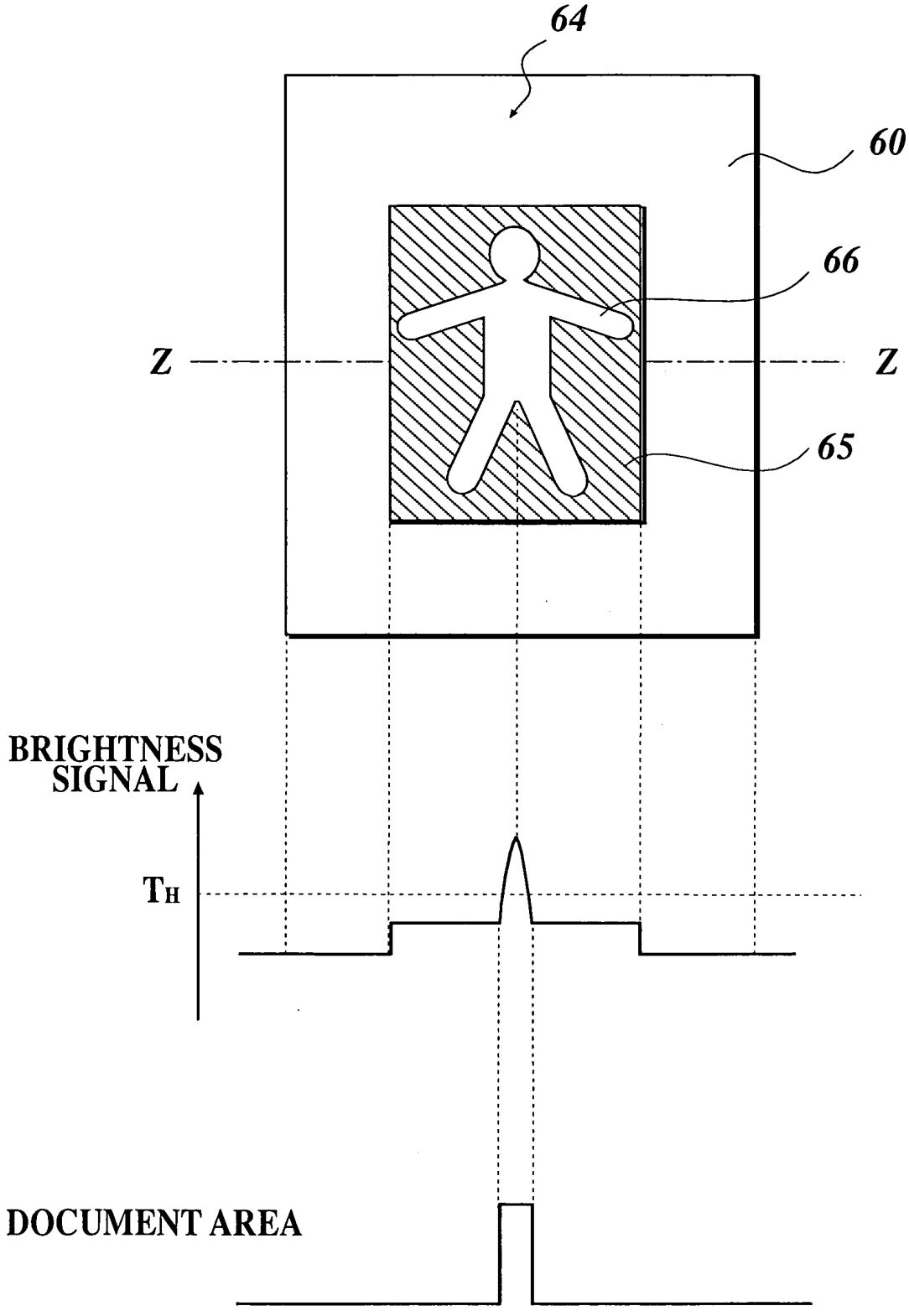
FIG.16